

NEW CALIFORNIA THYSANOPTERA WITH
NOTES ON OTHER SPECIES

BY DUDLEY MOULTON

*San Francisco***Ankothrips gracilis** Moulton, new species

Female, holotype. Measurements: Head, length .133 mm., width .15 mm.; prothorax, length .12 mm., width .18 mm.; mesothorax, width .22 mm.; total body length 1.25 mm. Antennæ: segment one 18 microns; two 54 m.; three 57 m.; four 51 m.; five 39 m.; six 39 m.; seven, (l) 18, (r) 20 m.; eight 15 m.; nine, (l) 20 m., (r) 18 m.; total length 270 microns. Wing length .68 mm., width .09 mm.

Color light yellowish brown including all legs and segments one and two of antenna. Segments three and four of antenna shading to dark brown in the outer half, segments five to nine dark brown. Crescents of ocelli brown. Wings slightly smoky, veins yellowish. All prominent spines yellowish to transparent.

Head including anterior projection almost as long as wide. Anterior projection angular, slightly emarginate in front, with two nearly straight bristles directed outward and backward, 24 microns (Fig. 1). Interocular bristles placed well forward near inner margin of eyes, 33 microns. Three pairs of postocular bristles near posterior margin of eyes, outer pair longest, 33 microns, median pair shortest, 18 microns, inner pair 21 microns. Eyes occupying about three-sevenths the side of the head, protruding in front, emarginate only on the sides, facets small. Ocelli inconspicuous. Antennæ with nine segments, slightly more than twice as long as head; projection on segment two dentate on either side, tip simple and pointed. Maxillary palpi with three segments.

Prothorax almost as long as head and one-third wider, prominent spines along anterior, lateral and posterior margins, a single one on each posterior angle longest, 45 microns. Mesothorax largest; metathorax noticeably smaller. Legs slender, fore femora only slightly thickened. Wings with parallel sides and rounded tip, typical of the genus. Costa with 32, fore vein with 24-23 and posterior vein with 18 spines; five cross-veins.

Abdomen elongate-ovate, with pointed tip. Longest spines on segment nine, 99 microns, and on segment ten, 81 microns.

Male, allotype. Measurements: Head, length .11 mm., width .13 mm.; prothorax, length .12 mm., width .15 mm.; mesothorax, width .18 mm.; total body length .85 mm. Antennæ: segment one 18 m.; two 48-54 m.; three 57 m.; four 48-45 m.; five 42-39 m.; six 39 m.; seven 20 m.; eight 15-12 m.; nine 18 m.; total length 270 microns. Wing length .55 mm., width .069 mm.; spines on wing, costa 26, fore longitudinal vein 18, posterior 17.

About two-thirds as large as female. Similar in color, interocular

spines 30 microns; postoculars, outer 36 m., median 18 m., inner 21 m.; spines on posterior angle of prothorax 45 m. A pair of long spines on posterior margin of eighth abdominal segment, 48 microns; ninth without a group of short stout bristles, and bearing only long slender spines on each posterior angle, 99 microns; a second pair of shorter ones near median posterior border, 39 microns; longest spines on segment ten, 78 microns (Fig. 2).

Described from nine females and three males taken from blossoms of "Chamise," *Adenostoma fasciculatum* near Riverside and Mayfield, California, May 16, 1926. All types are in author's collection.

Ankothrips æqualis Moulton, new species

Female, holotype. Measurements: Head, length .135 mm., width .20 mm.; prothorax, length .192 mm., width .27 mm.; mesothorax, width .36 mm.; total body length 1.56 mm. Antennæ: segment one 24 microns; two 75 m.; three 69 m.; four 60-63 m.; five 54 m.; six 48 m.; seven 24 m.; eight 15 m.; nine 21-24 m.; total length 360 microns. Wing length .92 mm., width .13 mm.

General color light brownish yellow, pterothorax orange-yellow; a dark brown line across anterior margins of abdominal segments two to seven inclusive, on the ventral side. Segments one and two of antenna yellow, three yellowish at base shading to light brown, four to nine dark brown. Ocelli with bright orange-red crescents. Legs concolorous with body except anterior margins of femurs and tibiae which are shaded brown. Wings slightly smoky, veins yellow. All prominent spines on body and wings deep brown.

Head, including anterior projection, distinctly wider than long. Anterior projection with sides parallel, emarginate in front, both points rounded, each bearing a short upward and outwardly curved bristle (Fig. 3). Interocular bristles prominent, 39 microns. The three pairs of postocular bristles situated rather close to posterior margin of eyes, subequal, 48 microns in length. Eyes large, pilose, protruding, especially in front. Anterior ocellus on apex of head directed forward, posterior ocelli bordering inner margins of eyes. Antennæ two and one-half times as long as head; projection on segment two with simple, pointed tip, but with an indentation on either side forming two additional points near the tip. Horseshoe-shaped transparent sense-areas at the end of segments three and four. Maxillary palpi with three segments, 30, 21, and 15 microns long respectively. Labial palpi with two segments.

Prothorax about one-third longer than head and one-third wider than long. Three forward directed spines on each anterior angle, longest 30 microns; three conspicuous spines along each side; two prominent spines on posterior angles, outer longest, 75 microns, inner 48 microns; eleven other strong spines along posterior margin, subequal, 45 microns.

Pterothorax with all angles rounded. Legs slender, fore femora thickened. Wings about eight times as long as wide, with parallel sides, broadly rounded at tip. Costa with 35, fore longitudinal veins with 28-26, posterior vein with twenty-three dark brown spines; five cross-veins.

Abdomen subovate. Longest spines on segment nine, 123 microns, and on segment ten, 99 microns.

Male, allotype. Measurements: Head, length .15 mm., width .195 mm.; prothorax, length .275 mm., width .255 mm.; mesothorax, width .33 mm.; total body length 1.33 mm. Antennæ: segment one 24 microns; two 69 m.; three 69-75 m.; four 66 m.; five 57-60 m.; six 51 m.; seven 24 m.; eight 15 m.; nine 21 m.; total length 360 microns. Wing length .83 mm., width .10 mm.

Male somewhat smaller than female; similar in color. Length of interocular spines 39 microns; postoculars subequal, 48 microns; spines on posterior angle of prothorax, outer 75 microns, inner 45 microns. Ninth abdominal segment bearing many short strong bristles on dorsum, the inner anterior pair strongest, 42 microns long and 6 microns wide at base; the outer posterior pair 48 microns long; longest spines on posterior angles of segment nine 135 microns and on segment ten, 115 microns (Fig. 4).

Described from thirteen females and eight males taken from blossoms of a species of *Prunus* near **Redwood City, California**, April 13 and 18, 1926. Mr. E. J. Newcomer also collected this species from *Spiræa corymbosa*, *Schizonotus discolor* and *Sambucus glauca* at Wenatchee, Washington, June 29, 1916. All types are in the author's collection.

CHIROTHRIPS SIMILIS Bagnall, 1909

This species has heretofore been found only in England and central Europe, and taken chiefly from roses and grasses. The author now records it as a common species in the San Francisco bay region, California, and during the last two years has taken it from grasses, wild lupine, coyote mint (*Monardella villosa*) and the terminal leaf clusters of prune trees.

On June 14, of this year, the author observed specimens of this species which had been trapped on the leaves of "mules ears," *Wyethia glabra*, near Mayfield, California. This plant exudes a resinous substance over the surface of its broad leaves which makes them sticky, and in this case acted as effectively as fly paper. More than two hundred specimens were thus caught on a single plant.

DREPANOTHRIPS REUTERI Uzel

This species has been known heretofore only in England, central Europe and Italy, and the recorded host plants are grape vines and the leaves of various trees, chiefly oak, beech-nut, and hazelnut. Mr. Theodore D. Urbahns, of the State Department of Agriculture at Sacramento, has collected many specimens of this thrips from grape vines near Florin, Sacramento County, California, and reports that it has been doing considerable damage.

The writer collected many specimens of males and females from grape vines near Mountain View, Santa Clara Valley, California, on June 26 of this year. This is the first record of the appearance of this insect in America; it has apparently been introduced on grape vines from Europe.

Genus ANAPHOTHRIPS Uzel

The genus *Prosopothrips*, which immediately precedes the genus *Anaphothrips* in the orderly sequence of relationship, is characterized by strong reticulation over the body. The writer mentioned in the original description of *Anaphothrips reticulatus* (*Sericothrips reticulatus*) that "this species has many characters in common with *Prosopothrips vej dovskyi* described by Uzel." The conspicuous reticulation and the angular projection on the front of the head set this species apart from other members of the genus, while the larval forms are typical of the genus. The writer now introduces a new subgenus based on these characters and names it

***Prosopoanaphothrips* Moulton**, new subgenus, and designates as its type the species *Anaphothrips* (*Prosopoanaphothrips*) *reticulatus* Moulton, 1907.*

Many specimens newly collected in the San Francisco bay region from February to June of this year show that the species varies in color from uniform brown to very dark brown, with the legs uniformly yellow brown to light brown. The male of the species is also found commonly with the females and is described as follows:

Male, allotype. Measurements: Head, length .15 mm., width .16 mm.; prothorax, length .13 mm., width .20 mm.; mesothorax, width .21 mm.; total body length 1.36 mm. Antennæ: segment one 27 m.;

* Technical Series 12, Part III, Bureau of Entomology, U. S. Dept. Agr., p. 50, April, 1907.

two 42 m.; three 48 m.; four 45 m.; five 45 m.; six 60 m.; seven 15 m.; eight 18 m.; total length 285 microns.

Color: Head and mouth parts and segments one, outer half of five, six, seven, and eight of antennæ dark brown. Thorax, abdomen, legs and segments two, three, four, and basal half of five of antennæ yellow, slightly shaded with orange.

Head and prothorax strongly reticulate, abdominal segments, excepting nine and ten, reticulate indistinctly, head slightly wider than long; vertex sulcate as in the female, with two prominent darkened, angular projections over basal segments of antennæ. Head without conspicuous spines. Eyes prominent; ocelli absent. Antenna eight-segmented, about twice as long as head, with a single long sense cone on segments three and four, and a short one on segment five.

Prothorax somewhat shorter than head; mesothorax smallest. Wings absent. All legs medium stout.

Abdomen elongate, segments two to eight almost equal in length and only slightly wider near the middle. Ninth abdominal segment with two pairs of stout spindle-shaped bristles near the middle. Longest spine on ninth abdominal segment 90 microns, on segment ten 69 microns (Fig. 5).

Described from eight specimens.

Host plants, grass and weeds in California, and *Æsculus pavia* (Southern Buckeye) and *Vinca* sp.? (Myrtle) in Alabama. All types in author's collection.

ANAPHOTHRIPS (ANAPHOTHRIPS) STANFORDI

Moulton, 1907

Male, allotype. Measurements: Head, length .105 mm., width .126 mm.; prothorax, length .120 mm., width .152 mm.; total body length .95 mm. Antennæ: segment one 18 microns; two 33 m.; three 36 m.; four 33 m.; five 30 m.; six 39 m.; seven 9 m.; eight 12 m.; total length 210 microns.

Color: Head and mouth parts dark brown. Thorax, abdomen, and legs uniform light yellowish brown to brown. Segments one and five to eight of antennæ dark brown. Segments two and three yellow, four yellow shading to brown. Heavy spines on ninth abdominal segment dark brown.

Males wingless, ocelli absent. The two pairs of heavy spines on the dorsal side of the ninth abdominal segment are located near the posterior margin of the segment (Fig. 6).

This species was originally described as a *Sericothrips*, but it is closely related to the European *Anaphothrips secticornis*.

ANAPHOTHRIPS (ANAPHOTHRIPS) APTERIS Daniel

The females of this species are most readily distinguished by the light yellowish brown color of the pterothorax, while

the rest of the body is deep brown or black. In life they often appear to be jet black, each with a yellow crossband. The males are smaller and are likewise dark brown in color with yellow or light yellowish brown pterothorax. Inner anterior pair of heavy spines on dorsal side of the ninth abdominal segment located rather near the center of the dorsum, at least twice as long as the outer posterior pair. Both pairs of the spines very dark and conspicuous.

This species has heretofore been classified under the genus *Sericothrips*, but is also closely related to *A. stanfordi*, and at times it is difficult to differentiate between the two species. The brown *stanfordi* is sometimes almost black, and the dark brown or black *apteris* may be lighter in color with the yellow pterothorax shading to brown, and almost uniform with the rest of the body.

Anaphothrips tricolor was described by the writer in 1911,* and a new and closely related species is now offered and named *A. bicolor*. Both species are characterized by an arrangement of angular plates, each bearing one and sometimes two spines, along the posterior margin of second to eighth abdominal segments, especially conspicuous on the seventh and eighth. A new subgenus is here erected to include these forms and the species *A. tricolor* is designated as its type.

Odontanaphothrips Moulton, new subgenus
Anaphothrips (Odontanaphothrips) enceliæ
new species

Female, holotype. Measurements: Head, length .09 mm., width .126 mm.; prothorax, length .105 mm., width .15 mm.; mesothorax, width .20 mm.; total body length .93 mm. Antennæ: segment one 15 microns; two 30 m.; three 39 m.; four, five, and six 36 m.; seven and eight 9 m.; nine 12 m.; total .222 mm. Wing length .585 mm.

Color: Head, prothorax, segments one to four of abdomen inclusive, all legs and segments one to three of antenna, light brownish yellow. Pterothorax slightly orange-yellow. Antennal segments four to nine light yellowish brown shading to dark brown. Abdominal segments five to ten uniformly dark brown. Crescents of ocelli light brown.

Head about one and one-third times as wide as long, cheeks arched; front of head broadly rounded; back of head faintly cross-striated, without prominent spines. Eyes prominent, occupying about two-thirds the width and one-half the length of the head. Ocelli

* Technical Series No. 21, Bureau of Entomology, U. S. Dept. Agr., June 13, 1911, p. 41.

present, inconspicuous (Fig. 7). Mouth cone long, angular, tipped with black, and reaching posterior margin of prosternum. Maxillary palpi three-segmented, labial palpi two-segmented. Antenna clearly with nine segments, slightly more than twice as long as head.

Prothorax about one and one-half times wider than head, sides slightly arched. One prominent spine on each posterior angle (39 microns). Mesothorax widest, emargination between meso- and metathorax deep. Legs slender. Wings transparent, veins slightly yellowish and prominent; anterior longitudinal vein joining the ring vein just before the tip, posterior longitudinal vein ending abruptly just before the tip. Two cross veins, an anterior one connecting the anterior longitudinal vein with ring vein at about one-third the wing's length from the end, and a median one connecting the two longitudinal veins at about one-third the wing's length from the base. The posterior longitudinal vein beginning abruptly just before the median cross vein. Anterior longitudinal vein bearing twelve more or less regularly placed spines between base of wing and anterior cross vein and three scattered spines on its distal third. Posterior longitudinal vein bearing fourteen spines scattered over its entire length. Anterior fringe hairs weak and single, posterior hairs weak and double (Fig. 8).

Abdomen from segments one to eight broadly ovate; ninth and tenth triangular in outline. Posterior margin of abdominal segments five to eight inclusive with an arrangement of angular plates, each bearing a short sharp spine. These spines longest and most conspicuous on segment eight, not so prominent on seven, and gradually disappearing at middle of segments six and five (Fig. 9).

Habitat, Coachella Valley, Imperial County, California.

Host plant "Desert Sunflower," *Encelia eriocephala*.

Described from a single female specimen (holotype) now in author's collection. Male unknown.

***Thrips heraclei* Moulton, new species**

Female, holotype. Measurements: Head, length .10 mm., width .12 mm.; prothorax, length .13 mm., width .16 mm.; mesothorax, width .14 mm.; total body length 1.25 mm. Antennæ: segment one 21 microns, two 36 m.; three 51 m.; four 51 m.; five 42 m.; six 51 m.; seven 18 m.; total length 270 microns.

General color almost uniformly light brownish yellow. Segments one, two, and three of antenna concolorous with head and body, one a little lighter; segments four and five brown in distal half, six and seven brown. Pigments of compound eyes deep purple; crescents of ocelli bright reddish orange. Tip of mouth cone brown, a brown spot on each tarsus.

Head only slightly wider than long, rounded in front, sometimes slightly angular. Cheeks arched. Interocular bristles prominent, brown, placed closely in front of posterior ocelli, 24 microns in length. Postoculars yellow and inconspicuous, 15 microns. Eyes

prominent but not protruding, occupying about one-half the length of the head. Ocelli approximate, separated from inner margin of eyes. Mouth cone triangular, reaching posterior margin of prosternum. Antennæ 2.7 times as long as head; a forked sense cone on outer dorsal side of segment three near tip and one on inner ventral side of segment four.

Prothorax about 1.3 times wider than head, angles rounded, sides arched. Two prominent dark brown spines on each posterior angle (inner 75 microns, outer 60 microns). Mesothorax largest. Legs moderately stout. Wings dusky; all spines long, brown and conspicuous, 22 on costa, fore vein with seven in basal half and three scattered in distal half of wing; posterior vein with eleven regularly spaced spines, scale 6.

Abdomen elongate ovate, only segments nine and ten narrowed abruptly and together triangular in shape. Weak, comb-like arrangement of small hairs along posterior margin of segment eight, a circle of eight long dark spines (120 microns) on segment nine, and a similar whorl on segment ten (longest 120 microns). Tenth segment with a faint median dorsal suture extending about three-quarters its length from tip.

Male, allotype. Measurements: Head, length .09 mm., width .105 mm.; prothorax, length .096 mm., width .126 mm.; mesothorax, width .165 mm.; wing length .52 mm.; total body length .88 mm. Antennæ: segment one 21 microns; two 30 m.; three 44 m.; four 44 m.; five 36 m.; six 51 m.; seven 15 m.; total length 241 microns.

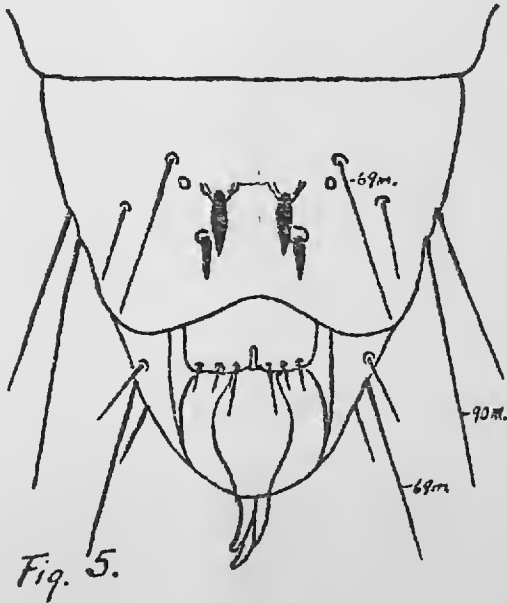
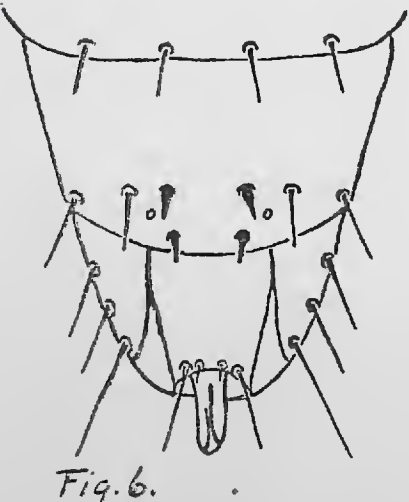
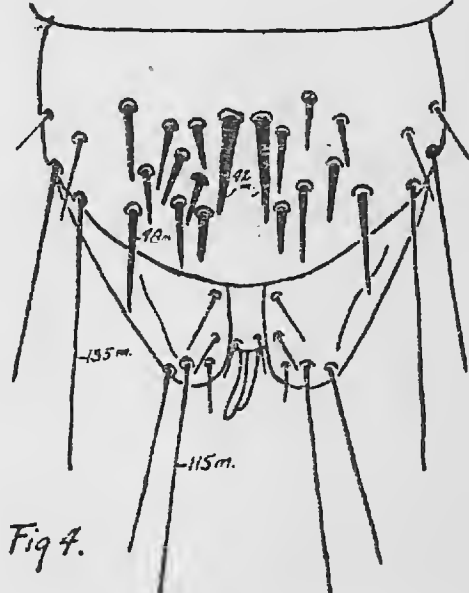
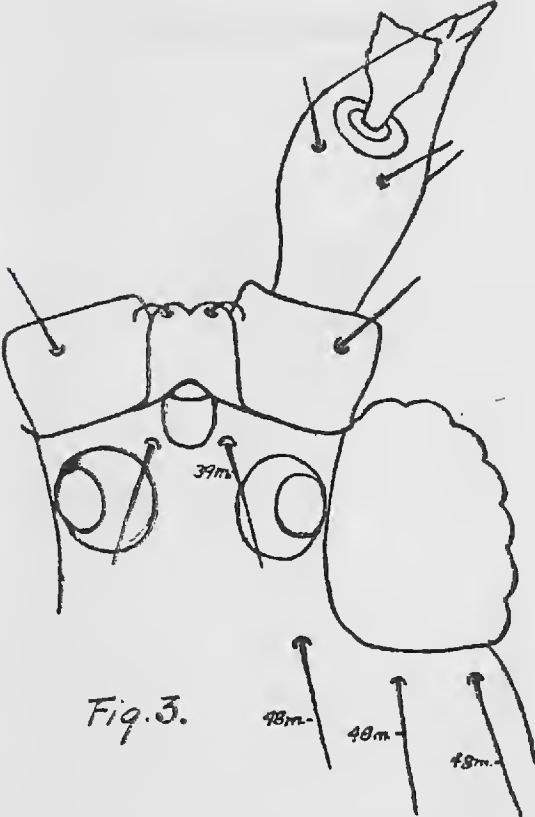
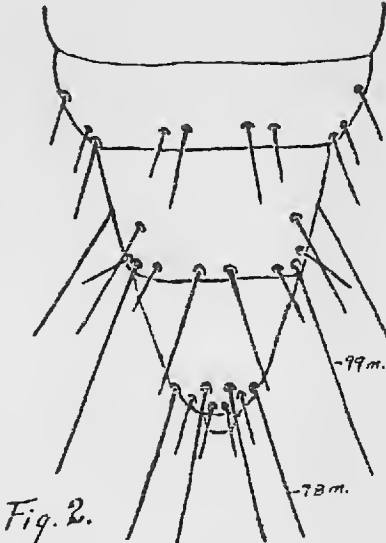
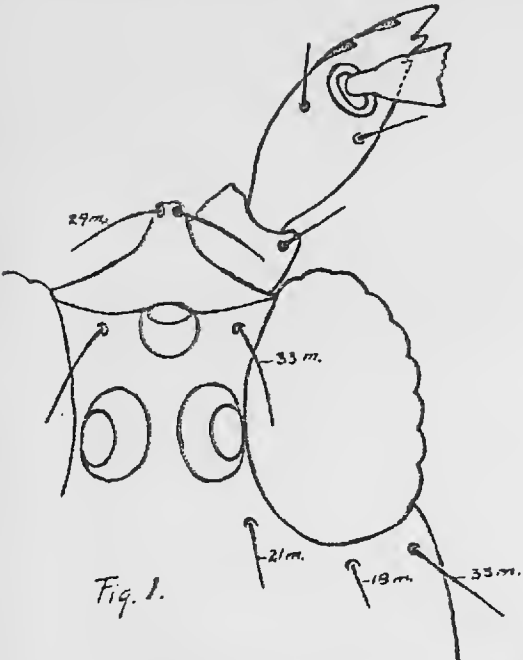
General color same as in female except distal half of antennal segments four and five which are light brown, and basal third of segment six which is very light brown.

Head only slightly wider than long. Cheeks arched. Interocular bristles brown, conspicuous, 18 microns. Postoculars yellow, inconspicuous, 15 microns. Eyes prominent, occupying about one-half the length of the head. Ocelli approximate. Mouth cone reaching posterior margin of prosternum. Antenna 2.7 times as long as head. Forked sense cones as in female.

Prothorax only slightly longer and slightly wider than head. Spines on posterior angles dark brown and conspicuous, the inner ones longer, 45 microns, the outer 27 microns. Legs moderately stout. Wings dusky; all prominent spines dark brown, 16 on costa, 10 on fore longitudinal vein, and 11 on posterior vein, scale 6.

Abdomen slender. Longest spine on segments nine and ten dark brown (75 microns).

Described from ten females collected July 24, 1925, and eleven females and three males collected June 16, 1926, from *Heracleum lanatum* (cow parsnip), above Spring Valley Lakes near Belmont, California. All types in author's collection. In life these thrips are of a bright golden color and are rather sluggish.



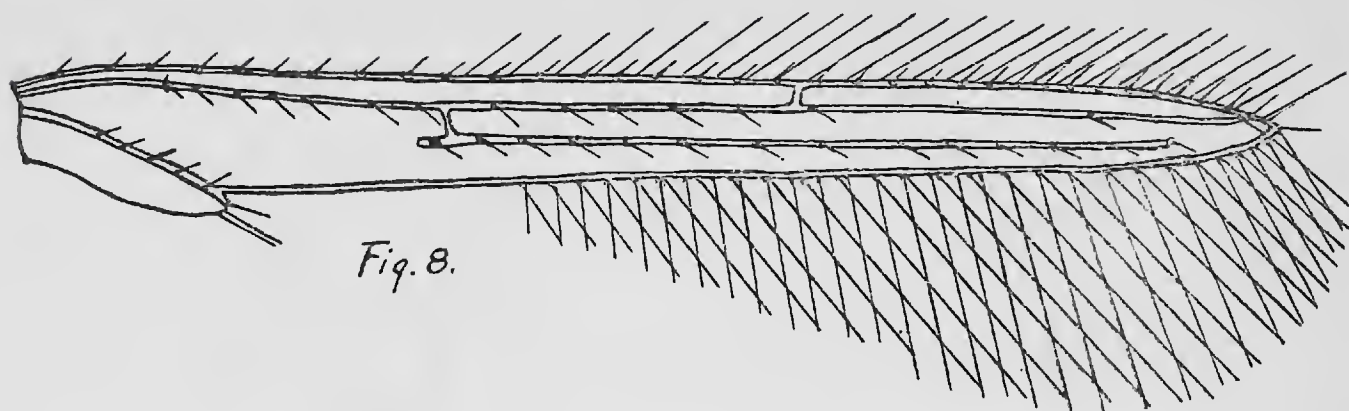


Fig. 8.

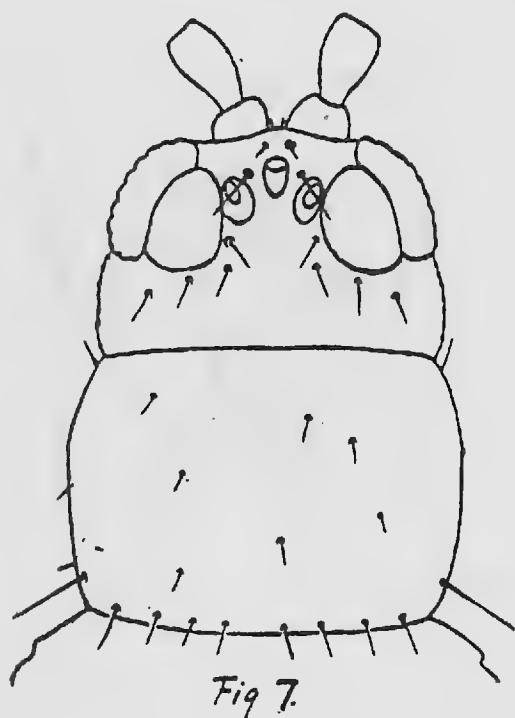


Fig 7.

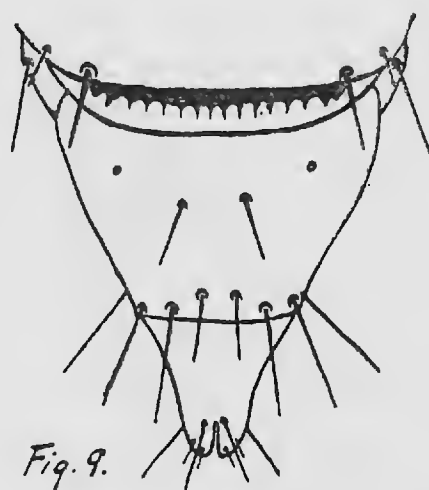


Fig. 9.

ILLUSTRATIONS

- Fig. 1. *Ankothrips gracilis* female, portion of head and antennal segments one and two, dorsal view.
- Fig. 2. *Ankothrips gracilis* male, end of abdomen, dorsal view.
- Fig. 3. *Ankothrips æqualis* female, portion of head and antennal segments one and two, dorsal view.
- Fig. 4. *Ankothrips æqualis* male, end of abdomen, dorsal view.
- Fig. 5. *Anaphothrips reticulatus* male, end of abdomen, dorsal view.
- Fig. 6. *Anaphothrips stanfordi* male, end of abdomen, dorsal view.
- Fig. 7. *Anaphothrips bicolor* female, head and prothorax, dorsal view.
- Fig. 8. *Anaphothrips bicolor* female, right fore wing.
- Fig. 9. *Anaphothrips bicolor* female, end of abdomen, dorsal view.